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THE
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☞See advertisement on last page.

Poetry.

THE SABBATH.

BY EBENEZER ELLIOT.

Sabbath holy!
To the lowly
Still thou art a welcome day.
When thou cometh, earth and ocean,
Shade and brightness, rest and motion,
Help the poor man's heart to pray.

Sun-walked forest,
Bird, that soarest
O'er the mute, empurpled moor,
Throstle's song, that stream-like flowest,
Wind, that e'er dew-drop goest,
Welcome now the woe-worn poor.

Little river
Young forever!
Cloud, gold-bright with thankful glee,
Happy woodbine, gladly weeping,
Gnat, within the wild rose keeping,
Oh, that they were blessed as thee!

Sabbath holy!
For the lowly
Paint with flowers the glittering sod;
For affliction's sons and daughters,
Bid thy mountains, woods, and waters!
Pray to God, the poor man's God!

From the fever,
(Idle never,
Where on Hope, Want bars the door)
From the gloom of airless alleys,
Lead thou to green hills and valleys,
Weary landlord's trampled poor.

Pale young mother,
Gasping brother,
Sister toiling in despair,
Grief-bowed sire, that life long diest,
White-lipped child, that sleeping sighest,
Come and drink the light and air.

Tyrants curse ye,
While they nurse ye,
Life for deadliest wrong to pay;
Yet, O Sabbath! bringing gladness
Unto hearts of weary sadness.
Still art thou "The Poor Man's Day."

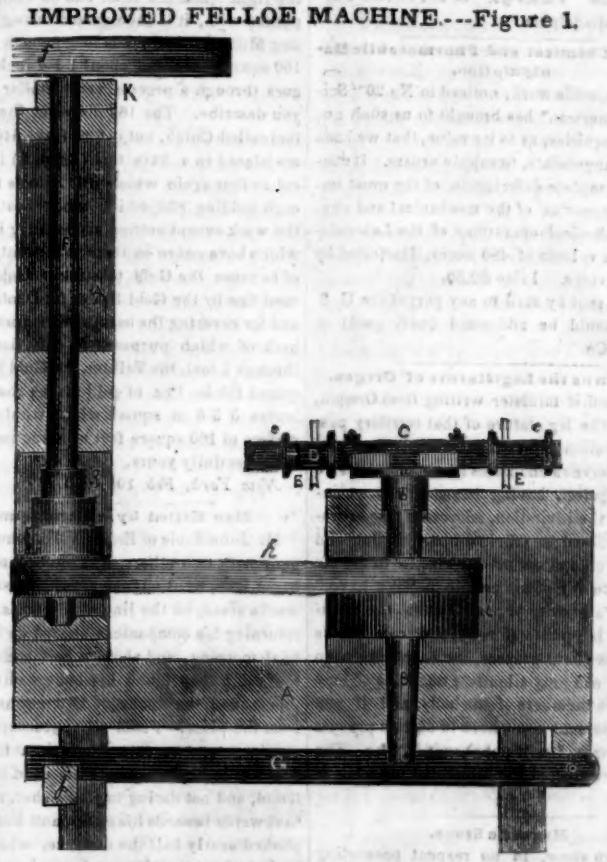
THE SEAMSTRESS.

Hark, that rustle of a dress,
Stiff with lavish costliness;
Here comes one whose cheeks would flush
But to have her garments brush
'Gainst the girl whose fingers thin
Wove the weary broidery in;
And in the midnights, chill and murk,
Stitched her life into the work;
Bending backward from her toil,
Lest her tears the silk might spoil;
Shaping from her bitter thought
Heart's-ease and forget-me-not;
Satirizing her despair
With the emblems woven there!

Bakers in Paris.

The number of bakers in Paris is 604, divided into four classes, according to the amount of business. The first class consists of such upwards of four sacks of flour a day, and the fourth such as bake less than two.

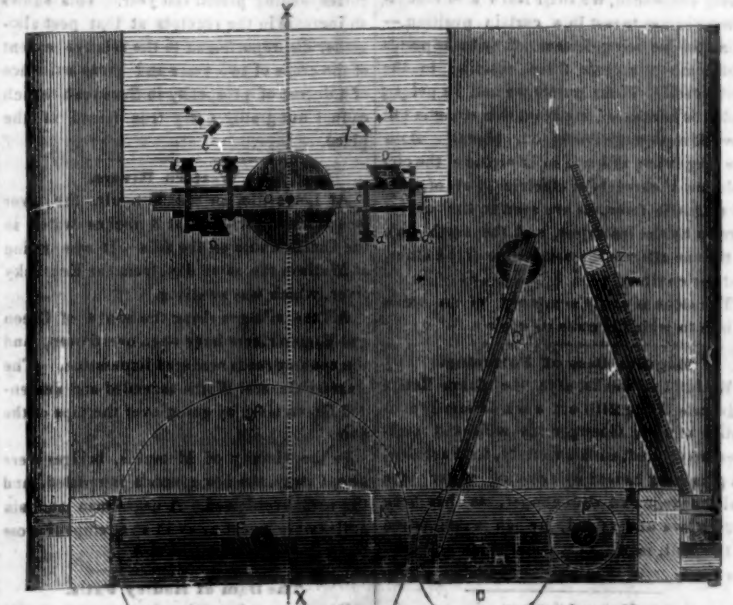
IMPROVED FELLOE MACHINE.---Figure 1.



This is a machine for cutting felloes of wheels out of plank, on which valuable improvements have been made by Joshua S. Lee, Adams, and T. H. Mores of Amherst, Mass., who have taken measures to secure a patent for the same. Fig. 1. is an elevated section of the machine at the line X X of fig. 2, which is a horizontal view, with the friction wheels removed. The same letters refer to like parts on both the figures.

A is a frame, B is an upright shaft resting in a moveable step at its lower end, and having a circular plate *a*, secured to its upper end, above the hub *b*. C is a horizontal beam secured between projections on the upper surface of the circular plate. D are angular metalic boxes with flanges on their sides attached to the beam by the straps *d*. E, are the cutters of the desired form passing through openings in the boxes and adjusted by screws. —F, is an upright shaft resting in a step in the frame and turning in a box screwed to a

Figure 2.



vibrating timber at its upper end and with a friction wheel and pulley *f* at the top, and a gang of pulleys *g* below, around which is seen the band *h* extending around a pulely *i* on B. G is a lever arranged below the frame and secured at one end to the front of the same by a pin upon which it moves and at its opposite end upon a similar lever *j* which is connected to a cross head, moving between upright ways. H is a vertical screw shaft passing through a screw in the cross head and having a button or shoulder at its lower end, which shoulder turns in a permanent block in the frame. Q is a lever moving on a fulcrum and connected at the end by a rod, which is connected to a lever below the frame having a weight hung on its upper end to counterbalance the weight of the vertical shaft of cutters and levers to relieve the screws of part of the pressure and prevent it from wearing. K fig. 2 is a horizontal beam containing the boxes in which the upper ends of the upright boxes turn and it is provided with tennons at the ends which fit into mortices in the vertical parts of the frame and has cords attached to its ends one of which with a weight passes over a pulley in the outside and the other cord passes over another pulley and is attached to a lever Z W, moving on a fulcrum, for lowering the cross head by lowering the said lever.

When it is desired to cut a felloe, the plank from which it is to be cut is placed upon the tables and firmly secured by the dogs and clamps *l*. The upright shaft is then set in motion by the friction wheels being brought in contact by the lever and therefore the cutter shaft by the band *h* is set in motion. The cutters E E, are set in the cutter heads by the straps *d d*, so that one cutter shall move in a circle cutting the outside of the felloe and the other cuts the inside circle, while the cutter shaft can be raised or lowered by the lever G, to cut the required depth. The dogs and clamps can be shifted on the table for larger or smaller felloes, and the cutters can be shifted on C C C, to correspond with the same.

By the end view, any person will get a good idea of the construction of this machine, but there are some little nice arrangements not herein exhibted, but the general arrangement is. We cannot say more in favor of this machine, than to state, that the felloes formed by it sell at a higher price than any other in our city.

RAILROAD NEWS.

St. Lawrence and Atlantic Railroad.

The report of the directors of this road has been published. The road has been opened 30 miles and is definitely located 100 miles, or within 27 miles of the boundary. Owing to some difficulty, not explained, the corps of civil engineers employed by the company had adandoned the undertaking simultaneously, both chiefs and assistants.

The North Carolina Central Railroad.

The bill to incorporate this important Railroad Company, which passed the House of Commons on the 18th ult., by 59 to 53, passed in the Senate to its third reading on the 20th ult., by 22 to 19. Its capital is $3,000,000, of which individuals are required to subscribe $1,000,000, and the State $2,000,000.—The main stem is to run through Raleigh and Salisbury to Charlotte, after intersecting the Wilmington and Weldon road near Goldsboro'.

Influence of Railroad in Massachusetts.

Travelling on Railroads in Massachusetts has become as familiar as riding in omnibusses, and people arrive in Boston from places at considerable distances, transact business, and depart homeward, with no more concern than one would bestow upon a walk from the Delaware to the Schuylkill. One instance of this is to be noted in the fact, that in the list of members of the Legislature, fifteen Senators and ninety-two Assembly-men are set down as boarding "at home."

Lexington and Frankfort Ky. Railroad.

Five hundred tons of rails for the above railroad reached Louisville a few weeks ago and the remainder will soon follow. This road is expected to be finished by 1st October next.

Notice has been given in the Canadian Parliament to enquire if ministers have taken any steps to prevent the bridging of Lake Champlain by the Ogdensburgh Railroad Company, thereby violating the existing treaties, which guarantee to British subjects and to the United States, the uninterrupted navigation of the lake.

Great complaints are made about the miserable condition and bad management of the Central Railroad, Georgia. Those Railroads that are constructed in the most durable manner always pay best. A miserable flat rail for original cheapness, is ultimate loss.

Lockport and Niagara Falls Railroad.

This road has been leased for five years past at $1,550 per annum, with the reserved right to claim it whenever it should be wanted by the company for the purpose of extension to Rochester, or to renew it with heavier rails. It has consumed the rent to pay the taxes and discharge debts incurred for surveys of the extension and other purposes. The length of the old road is 23 miles and of the extension to the Genesee river at Rochester 54 70-100 ; cost of construction of the old road $210,000. No dividends have been made the last five years.

The whole capital for the old road and extension is fixed by the Legislature at $1,200,000. Over $950,000 has been subscribed for the extension. The masonry, grading and bridging, and completion of the road, ready for the superstructure, is under contract from Lockport to Rochester, and about $25,000 has been expended for the extension. It is expected to have the whole ready for the iron within the coming year.

The income for the past year to the lessees has been $15,000, principally from way passengers. The number of passengers, as nearly as can be ascertained, is—Through 30,000 ; way 20,000 ; United States mail, $750 ; expenses of repairs $6000 ; running expenses $5000 ; number of miles run 36,000. Three locomotives on the road, six passengers cars, five freight cars, one baggage car. Average number of men employed on the road 20.

Railroad Accident and wonderful Escape.

As the the Boston and New Haven cars came into Thompsonville, Wednesday week, going at the rate of thirty miles per hour, from a misplacing of a switch the cars were thrown off the track, the engine passing safely on to the bridge, but weakening it so much that the tender and baggage car separated from it, and were precipitated through and dashed to pieces, and the first passenger car also pitched through the rear part sticking above the bridge. The chasm beneath the bridge is about forty feet, and wonderful to say, not a life was lost, though the car was filled with passengers. The engineer was slightly injured in jumping from the locomotive, while the fireman who remained on it was unhurt.

Singular and Fatal Accident.

The N. O. Picayune says that Mr. Henry Melbourn, a planter, residing in the parish of Avoyelles, on the Bayou Boef, was killed a few days since at his gin house in the most singular manner. He had just completed his gin and while examining some part of the running gear near the band wheel, his neck was caught between that and the lever, and his head almost completely severed from his body. Mr. Milbourn was about fifty years of age, a hard working man, and the father of a large family.

We publish accidents of this kind so as to warn those who are engaged among machinery to be careful of belts and running gear.

New Whaling Ground.

From Honolulu, Sandwich Isles, we learn that Capt. Royce, an American, of Sag Harbor, L I. had just arrived with 1,800 barrels of oil which he took in the Arctic Ocean above Behring Straits. He found the seas clear of ice, pleaty of Whales, and one a new kind. From the imperfect knowledge of the seas he had to be very cautious. He found the ocean there very shallow 14 and 35 fathoms, and he saw Indians crossing in their canoes regularly from Asia to the American continent. There can be no doubt but the two were once united then. Some interesting discoveries are yet to be made in that region.

One of the large establishments of Messrs. Hoe & Co. of this city, so well known, was burned down last week. The fire, however, does not stop their business, as they have other manufactories.

LITERARY NOTICES.

The March number of the Ladies National Magazine, comes to us laden with its usual variety of select and entertaining matter. The beautiful Mezzotint of "the Caliph's Daughter" by Gross, is truly one of the best and the expression of countenance tells the reader at once the meaning of the accompanying tale by Dana. It is only necessary to add that, the editorial charge is in the hands of Mrs. Ann S. Stephens. Terms $2. C. J. Peterson Publisher, Philadelphia.

Morfit's Chemical and Pharmaceutic Manipulation.

This valuable work, noticed in No 20 "Scientific American" has brought to us such numerous enquiries, as to its value, that we have made arrangements, to supply orders. It contains a complete description of the most improved apparatus of the mechanical and chemico-mechanical operations of the Laboratory. It is a volume of 480 pages, illustrated by 423 engravings. Price $2,50.

Can be sent by mail to any part of the U. S. Orders should be addressed (post paid) to Munn & Co.

Who owns the Legislature of Oregon.

A Methodist minister writing from Oregon, says that the legislature of that territory passed a resolution requesting the ministers of the place to serve as chaplains in rotation. The Catholic priest, having been of course included in the invitation, addressed the speaker and offered to officiate himself, but said that he would allow no one else to to dictate a prayer to any of his people. "We have," said he, "authority to preach from the apostles ; this is a political body, and can do its business without prayers, or each one who wishes it can pray silently ; but some of my people are members of the body, and if any of these persons come here to dictate prayers to my people, I will not permit it," &c. The house then elected the Methodist minister as chaplain

Magnetic Stone.

A brown stone, in no respect presenting anything by which it shall be distinguished from other rude stones around it, is found, upon close examination, to possess the power of drawing light particles of iron towards it. If this stone is placed upon a table, and iron filings are thrown lightly around it, we discover that these filings arrange themselves in symmetric curves, proceeding from some one point of the mass to some other ; and upon examining into this, we shall find that the iron which has once clung to the point, will be rejected by the other. If this stone is freely suspended, we shall learn also that it always comes to rest in a certain position,—this position being determined by these points and some attractive force residing in the earth itself. These points we call its poles ; and it is now established that this stone is but a weak representative of our planet. Both are magnetic ; both are so in virtue of the circulation of currents of electricity, or of lines of magnetic force, as are seen in the curves formed by the iron dust, and the north pole of the one attracts the south pole of the other, and the contrary.

The stone is partly composed of an oxide of iron to which it owes its color.

Singular Case of Poisoning.

Within two weeks, says the Baton Rouge Advocate of the 24th ult. a whole family consisting of a Mr Goettger his wife and children, have died, in this vicinity, from accidental poisoning caused by drinking water of a well impregnated with copper, as has been proven, we understand, by an examination of the well, in which was found an old copper kettle.

Maine Lumber.

The Calais (Maine) paper of the 25th ult. speaks of very cold weather and very good sleighing, and adds that "the business doing by the teams in the woods never promised so fair a prospect of remuneration as it does now to those engaged in the lumbering business."

Salt.

The Onondaga Salt Springs have produced during the past year, 4,737,162 bushels of salt or 947,425 barrels. Is not this a gold mine ?

Gold Leaf.

Mr. Editor.—In an article on the Manufacture of Gold Leaf in last week's Scientific American, there are a few slight errors which I presume you would like to correct with your accustomed accuracy. In the first place Gold for Leaf cannot be used fine. Deep Gold for frames &c. is about 23 carats, the lighter kind for books &c. from 18 to 24 carats according to the color required. Again, the gold is melted and poured in an ingot which if square and of the right width the anvil can be entirely dispensed with, it is then passed through a Rolling Mill until 50 dwts. is long enough to make 160 square pieces of about 1 1-4 inch, which goes through a process very similar to what you describe. The 160 pieces in the Vellum tool called Cutch, cut in four make 640, which are placed in a Skin tool (Shoder,) it is then cut in four again which fills 3 tools (Molds,) each holding 850 which when beat finishes the work except cutting and placing in books, which have ochre on them to prevent, instead of to cause the Gold to stick. Gold is only used fine by the Gold Beater for Dentists' Foil and for covering the bar for Wire drawing, for both of which purposes it only has to pass through 1 tool, the Vellum, the Gold being required thick. 1 oz. of gold makes about 2,300 leaves 3 3-8 in. square which would cover a surface of 160 square feet or a fraction under.

Respectfully yours, J. H.

New York, Feb. 10, 1849.

Man Killed by a Catamount.

Mr. John Soule of Errol, N. H., who in company with two others, was hunting near Umbagog lake, went out one afternoon, some four weeks since, on the line of his traps, but not returning his companions started on his track next morning, and about a half a mile from the camp they found his body badly torn in pieces, and the tracks of two animals going from the place. From all appearance, Soule came across two catamounts in a tree some half a mile beyond where his dead body was found, and not daring to risk a shot, retreated backwards towards his camp, and had accomplished nearly half the distance, when he fell backwards over a log, and was leaped upon immediately by the catamounts. His rifle was by his side, loaded and cocked. His companions followed the tracks of the animals till they retreated in a circle, and, hearing them make a noise, became frightened, and gave up the chase.

Cotton Receipts at Savanah.

By the last weekly statement of the Republican the total receipts of cotton at that port from the 1st of September last to the 24th ult. was 185,566 bales against 65,333 during the corresponding period last year. This shows an increase in the receipts at that port altogether disproportioned to the relative extent of the crops of two years and gives evidence of a degree of prosperity in Savannah which cannot but gratify every true friend of the place.

The Western Rivers.

At Louisville, on the 25th ult, the river was at a stand with 9 feet 3 inches water in the Indian chute on the falls. It was rising at Madison the same day, from the Kentucky river, which was swelling.

All the villages along the banks of Green and Barren rivers have been overflowed, and the country roads rendered impassable. The steamer General Worth ascended and descended Green river by going over the tops of the dams.

In the vicinity of Memphis, bridges were swept away, the low grounds inundated, and the roads overflowed. A negro man and six mules were swept away in an attempt to cross Cane Creek, and all drowned.

The Dam at Hadley Falls.

Preparations have already been commenced for the re-building of the Dam at the New City.—It is to be of wood, of square timber. It will be built in a most substantial mannner. The cheapest way in the end.

Temperance in Vermont.

The recent State Temperance Convention at Burlington, Vt. was characterized by much enthusiasm and determination, and the Temperance cause has thereby received a fresh impetus in the Green Mountain State.

The Snow Worm.

The National Intelligencer says : "We have been shown a letter from Professor Chester Dewey, of Rochester, N. Y. (addressed to a scientific gentleman of this city,) from which we learn that the snow in that region has recently been covered with worms varying from a quarter of an inch to an entire inch in length. We are also informed that a small worm of a dark color, and resembling a tiny bud or seed, was found upon snow in North Carolina during the last winter ; and also that about two years ago a small worm of a scarlet hue was found on the snow in Tennessee."

Wealth of the Union.

It is estimated that the value of the crops in 1848 in the United States will exceed $646,000,000. Value of live stock on farms is estimated at over $557,000,000. The sums invested in manufactures for the same time amount to $343,300,000. The sums invested in merchandise amount to $344,000,000, exclusive of $149,000,000 employed in the commission business and foreign trade. The aggregate of the productions and business of our country then, amounts to the enormous sum of more than $2,000,000,000.

A Literary Prize.

The King of Bavaria has offered a prize of 100 ducats for the best essay on the subject, "By what means can the poverty of the lower orders of the inhabitants of Germany, and more especially of Bavaria, be most advantageously and permanently relieved." The essay are to be given in by the 31st of January next, and will be submitted for decision to a competent committee nominated by the King.

Iron Cottages.

Quite a number of Iron cottages have been built in this city and sent to Oregon. This is a good plan, as the houses in California will soon be more scarce than the inhabitants.—There is only one blacksmith's shop in San Francisco, and only two blacksmiths. One of them is our old friend Mr. Leddy, of Albany, N. Y, who is rapidly making gold out iron and hard blows. Well, no one deserves better success.

The Planters' (La.) Banner. says ; "There is great complaint among many of the planters in this vicinity of the condition in which they find their seed cane. Some estimate that one third of their cane is ruined. Much of it is hollow, with a sort of red coating on its interior surface, the joints have red streaks passing through them, and many of the eyes appear to be entirely destitute of vitality. If the cane generally proves to be in this condition, we may look out for short crops again next Fall."

Quite an extensive land slide occurred at Natchez on the 20th ult., near the upper end of the promenade ground. A portion of the bluff, says the Courier, some 10 feet broad and 40 feet in length, detached itself very unceremoniously from its ancient resting place, and pitched down into the road beneath

A Mr. Emmons was so severely wounded a short time ago in Philadelphia, by a knife breaking in one of Beer's machines when making 2000 revolutions per minute, that his limb had to be amputated in consequence thereof.

A correspondent of the London Lancet, says that nux vomica in small doses is a cure for dyspepsia. "He tried it himself," by the advice of a homœpathic physician, with perfect success.

Believing that the rice fields, in the vicinity of Savannah, were detrimental to the health of the city, the Mayor and Aldermen passed ordinances prohibiting the culture of rice within limits.

The price of cabin passage from Cincinnati to Pittsburg on the first class boats, is now $7 ; to St. Louis $9 ; and to New Orleans $12a15. The rates, however, vary according to temporary circumstances.

Galvanized wire netting is sold in London, at one penny the square foot.

Fifteen million yards of calico are annually manufactured in this country.

There were 2,500,000 bales of cotton raised in the United States in 1848.

Source of Animal Heat.

Messrs. Munn & Co.—I notice in your paper of Jan. 20th, an article headed "Heat and the Human Body," which contains a number of misstatements I propose to correct by your permission. You say "the human body is by some *inscrutable* arrangement supplied with an internal fountain of heat by which its temperature is maintained over the air which usually surrounds it. The fountain of heat owes its origin to the same *unknown* principle as *organization* itself."

Justus Liebeg has scrutinized the human body so closely as to discover the fountain head of heat, as the following extract from his work on Animal Chemistry will show. At page 20, he says: "These experiments and the conclusions deduced from them, in short, are incapable of furnishing the smallest support to the opinion that there exists in the animal body any other unknown source of heat, besides the mutual chemical action between the elements of the food and the oxygen of the air. The existence of the latter cannot be doubted or denied, and, and it is amply sufficient to explain the phenomena."

You say: "The fact of its existence and that it i capable of supplying a certain quantity of the caloriffic principle, *are all that we can know*."

You surely forgot the progressive age we live in when you wrote that paragraph, it is impossible to tell what we *can know*, it is as much as editors and authors can do to record the discoveries and inventions that are showered on the wondering inhabitants of this globe, and this is only a commencement. A few years ago, before Liebig published his researches on animal heat, food, the blood, and vegetable life, it was a reasonable conclusion that we should know but little more about life and the body; but now with the aid of chemistry it is probable that even greater discoveries will be made than have yet astonished the world.

You state in your article on the 20th, that "the air taken into the lungs undergoes a change, *with the nature of which we are not acquainted*." The air is deprived of its oxygen when taken into the lungs, as Liebeg shows at page 14. He says: "According to the experiments of Lavoisier, an adult takes into his system, from the atmosphere, in one year 746 lbs., according to Menzies 837 lbs of oxygen; yet we find his weight, at the beginning and end of the year, either quite the same, or differing, one way or the other, by at most a few pounds.

"What, it may be asked, has become of the enormous weight of oxygen thus introduced, in the course of a year into the human system?

"This question may be answered satisfactorily; no part of this oxygen remains in the system; but it is given out again in the form of a compound of oxygen or hydrogen.

"The carbon and hydrogen of certain parts of the body have entered into combination with the oxygen introduced through the lungs and through the skin, and have been given out in the form of carbonic acid gas and the vapor of water

"At every moment, with every expiration, certain quantities of its elements separate from the animal organism, after having entered into combination, within the body, with the oxygen of the atmosphere.

"If we assume, with Lavoisier and Seguin, in order to obtain a foundation for our calculation, that an adult man receives into his system daily 32½ oz. (46,037 cubic inches=15,661 grains, French weight) of oxygen, and that the weight of the whole mass of his blood, of which 80 per cent is water, is 24 lbs.; it then appears from the known composition of blood, that, in order to convert the whole of its carbon and hydrogen into carbonic acid and water, 64,103 grains of oxygen are required.—This quantity will be taken into the system of an adult in four days five hours.

"The mutual action between the elements of the food and the oxygen conveyed by the circulation of blood to every part of the body is *the source of animal heat*."

Lastly, you say, "this we know that when it is expired *its nature is changed* and it has acquired the *qualities of carbonic acid gas*." Now what is expired from the lungs is not the air that is inspired, but a *mixture* of carbonic acid nitrogen and vapor of water; in proof of this assertion I quote Liebig page 39, where he says: "The carbonic acid of effervescing wines and of soda water, when taken into the stomach, or of water saturated with this gas, administered in the form of enema, is given out again through the skin and lungs; and this is equally true of nitrogen which is introduced into the stomach with the food and in the Saliva"

The oxygen of the air is extracted, and consumed while the nitrogen is thrown out of the body, because, it is not wanted there

Yours Respectfully, W. L. Lay.

Philadelphia Feb. 2, 1849.

[We know a *few* things, but there are some things we don't know, and friend Lay has not made us a whit the wiser. We read Liebeg long ago, and however sufficient his exploration of *animal heat* may be to others, it is not sufficient for us. The elements of heat, (but what is heat?) may be contained in food and air, but are these substances heat itself? The heat of our bodies is maintained by the low combustion of our food, &c., and this was known before Liebeg wrote on the subject, but neither bread, beef, water, nor the oxygen of the atmosphere is combustion, in fact, there is no chemical action more difficult to explain than simple combustion—and Liebig's *mutual*, will not do it. Oxygen and nitrogen are the elementary gases of our atmosphere, but they are not *the atmosphere*. The elements of our food may lie in our larders in contact with the atmosphere till doomsday without producing the combustion which developes the heat that keeps up the steam to propel our man machines. Further discoveries may yet disclose to us that bodies which unite with oxygen and the *quantity* of heat evolved by the chemical combination, may be connected with the equivalent number and the electrical condition of substances by a definite law, but the investigation of this subject may well be left for a more subtle philosopher than Liebeg—viz Faraday—and until this takes place friend Lay will be pleased to give his last paragraph a more logical examination, as it is the climax of his explanation, confounding his argument and leaving the question of *animal heat*, as developed, sustained and at last extinguished in our frames, still unexplained.—Ed.

On the Metallization of Plaster Casts.

BY M. A. BRANDLEY, CIVIL ENGINEER, PARIS.

The plaster casts are first immersed in melted wax, either white or yellow, for the purpose of rendering the plaster incapable of absorbing moisture, and giving an appearance of softness. Any excess of wax may be removed, and the cast allowed to cool. Then take:—

Sulphuret of Carbon : : : : 1000 parts
Good clear Phosphorus : : : : 250 parts

A few minutes after having shaken the phosphorus in the sulphuret it is entirely dissolved. Then take:—

Silver, in fine grains : : : : 100 parts
Pure Nitric Acid : : : : : 550 parts

Dissolve the silver, evaporate the excess of acid, and dilute the solution with 100 parts of distilled water. When the nitrate of silver is dissolved, take two basins, each capable of containing two quarts; in one place the solution of phosphorus, and in the other the nitrate of silver solution. The quantities above given are the result of a great number of trials, and they are those which have been found to answer the best. The plaster casts fixed to a copper wire are dipped in the solution of phosphorus, and after having been allowed to drain, are placed flat on a plate of sheet-iron or zinc, with the engraved side uppermost.

When all the sulphuret of carbon has evaporated the casts will commence to give off phosphoric vapors; it is then ready to be dipped in the solution of nitrate of silver. The bottom as well as the side should be completely dry before this immersion. Care must be taken that every part of the cast should be covered with a solution, and to ensure this it may be touched over with a brush after it is taken out of the silver solution, otherwise a hole would appear in the point not touched with the solution. The cast is then allowed to drain, and is afterwards suspended by the wire to dry.

The presence of phosphorus produces the reduction of the silver which soon takes its natural color. The moment this has taken place, plunge it into the phosphorus solution, where it may remain for from eight to 15 days; instead of remaining white it assumes a dark color by the evaporation of the phosphoric acid, which re-acts on the silver and the oxide. In this state the casts receive an equal coating of metal, but less freely, because the oxides are not so good conductors as the metals themselves.

The process finished, carefully pour the solution of phosphorus into a stoppered bottle, which should be placed in the cellar, or in a large vessel of water. If it should happen that during the operation any of the solution has fallen on the fingers, they should be immediately dipped in nitrate of silver solution, to prevent the action of the phosphorus on the skin.

The process should be performed on a marble slab, or, what is better, on a plate of zinc, to avoid the accidents which might arise from the action of the phosphorus on wood.

If the casts requiring to be metallised are of a large surface, lay them over a sheet of cast-iron by means of a triangle of iron reaching to their full length, and pass over their surface the solution of phosphorus, and afterwards that of nitrate of silver.

When the casts have been metallised and are dry, they should be brushed over lightly with a soft hat-brush and the metal on the back parts may be scraped off.

However soiled it might have been, a cast thus prepared becomes certain in the effect produced, whether it be wished to obtain reproductions from it by the electrotype process, or to have a simple covering of metal to protect the casts. Another advantage is that the metallic deposit is more agreeable to the eye than that of the plumbago, or the metallic powders. Unfortunately it cannot be applied to casts taken in stearine, with which we must for the present continue the use of plumbago.

Winter Fishing on the Upper Lakes.

At Sundusky and all along the Bays of the Upper Lakes, both on the north and south shores, much amusement and of a profitable kind too, is found in fishing through the ice. During this present winter which has been unusually severe, the Lakes are very solid, and there is rare winter fishing. At Sundusky, Ohio, which has a fine Bay about 8 miles long and four broad, the sport has been unusually good and enjoyed by both old and young. Afar off the shore on a line were erected temporary buildings each one occupied with a single tenant seated upon a cushioned stool beside a sheet iron stove. His house is situated over a hole cut in the ice, and there he sits contentedly, with a fish gig in his right hand and a decoy fish dexterously managed by the other, waiting the visit from one of the finny tribe. Hold! Did you see the broad flat nose of that noble pike, as it protuded beyond the limits of the ice orifice? A slight movement of the left hand, and the decoy glides about like a thing of life—the pike darts suddenly upon it, the fish gig of the patient fisherman descends like lightning, and the next moment a ten pound pike lays floundering, dying, upon the floor of the cabin—The hunter detaches it from the gig, throws it outside the door to freeze, adjusts his decoy and makes ready his spear for another onset.

This is the way in which the tables of our inland citizens are supplied with the most dainty fish.

Railroad Steamboat.

There is at present building at Glasgow by Robert Napier, an iron steamboat 180 feet long and 35 broad, with three lines of rails on deck to take a train of cars 500 feet long on the boat at once, on the three tracks. It is to be propelled by a 240 horse power engine and is to connect the Northern Railway across the River Tay at Broughton Ferry, where it is about a mile and a half broad near the sea.—The banks on each side are high and water low between, so the cars are to be let down into the boat by an incline plane worked by stationary engines and raised on the other side in the same manner, so that it may be said that the railroad company has made a floating railway across the Tay.

A little saltpetre put into old cream takes away its bad flavor when churning.

Cocculus Indicus.

The fruit of a tree growing upon the coast of Ceylon, and imported from the East Indies in bags, and hence also called Indian berry. It is similar in appearance to the *bay berry*, but slightly smaller, and is distinguished therefrom by the semi-lunar form of the oleaginous yellow seed, which seldom entirely fills the cavity of its shell. It is sometimes employed as a dangerous and fraudulent sophistication of malt liquors, in order to increase their exhilarating influence; a most reprehensible practice, for the berries owe their active properties to a narcotic, poisonous, crystallizable principle, *pidrotoxin* or *cocculin*, which is bitter to the taste and of neutral reaction. Besides this, there is left in the alcholic extract of the fruit, from which the cocculin has been dissolved by means of acidulated water, a brown resinous acid, called the picrotoxic acid. Menispermin and Peramenispermin are also constituents of the fruit, alike in composition, but dissimilar in certain properties, the former being crystallizable and capable of forming salts, while the latter, though crystalline, is unable to saturate acids, and is moreover less fusible and more insoluble in either. The above-named together with yellow alkanine, resinous and fatty matters, wax, gum, starch, chlorophylle, lignin, mucus, malic acid, odorous and inorganic matter, represents the composition of the berry. According to Meissner, crystals of picrotoxin are readily obtained by the evaporation of a concoction of the berries.

This substance has been used in Britain for adulterating Beer. It has also been used to destroy fish in streams and rivers.

Peat for Fuel.

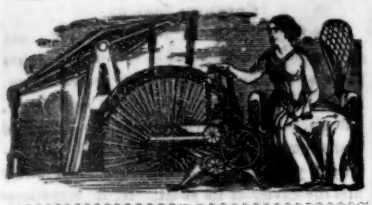
The editor of the Portland, Maine, Enquirer suggests "the employing of peat for fuel in air tight stoves, as there are plenty of peat bogs in Maine." Peat is good fuel. The upper part of the bog is but poor, being light and turfy, but the under black strata, when cut into square pieces about 4 inches thick, and 12 inches long, and well dried, makes both a warm and clean fuel. By pressing the moist peat, like brick, they are made nearly as solid as coal, easily dried and burn for a long time. A machine for pressing peat we see by our foreign exchanges, has been invented by Lord D'Eresby, for improving the condition of his Highland tenants, who frequently suffer for want of fuel, owing to the wet seasons so common in Scotland, which prevent their peat from ever being thoroughly dried. Peats are cut in the bogs, by first digging a trench, and then by a sharp spade of the exact width and length, the peats are cut from the face of the trench. They are then exposed to dry like brick in our brick yards. This is the only kind of fuel known and used in many parts of Ireland and some of the northern European countries.

The Ophir of Solomon.

There is a large mountain called "Ophir," says a recent traveller, contiguous to the coast of Malacca, and it abounds in gold. In sailing close along the shore at night the air was perfumed as if with spices and frankincense. The whole country teems with rich and rare products. Sofala, on the contrary, is a low swampy territory; no mountain is visible; gold is certainly obtained there, brought from the interior, but there are no spices, frankincense, or myrrh. Its latitude prohibits the growth of those articles, while Malacca is especially adapted for them. The transition of the Jews from Malacca, up the coast, to China, was an easy matter; indeed, the Chinese themselves visited the Red Sea and Persian Gulf. About the year A. D, 1150, the Rabbi Benjamin, of Tudela, visited several Eastern countries, for the express purpose of ascertaining the residence of the lost tribes. The Rabbi found some of his brethren in Sarmacand, China, and Thibet; in the first city the found 50,000 Israelites.

To those who consider California as the ancient Ophir, we would just like to ask of them where Solomon got his apes and peacocks from, that were brought in his Ophir ships.

Mr. Devereux, of North Carolina, a most accomplished gentleman and farmer is the largest corn grower in the Union, his crop being largely upward of 100,000 bushels.



New Inventions.

New Tongueing and Grooving Machine.

Mr James L. Paige of Rochester, N. Y., has invented a new and beautiful matching machine for tongueing and grooving boards, which is allowed by all those who have seen it operate to be the best ever brought before the public; the work it performs equals hand labor in quality. The common plans for tongueing and grooving, are either saws or revolving cutters, or by the matching planes by hand. Mr. Paige performs the matching by power, on the same principle of operation as the matching plane, but he has a series of chisels moving on a sliding frame in which one after the other cuts out a shaving till the groove is cut out the required depth, and the tongue formed of the exact size. He uses pressure rollers for feeding and a straight edge board set at an angle on the frame in combination with the rollers, whereby the boards are moved perfectly steady from first to last through the whole length of the machine. The combination of the pressure rollers with the sliding planing frame is to keep the boards from being driven from side to side and well does it operate for this purpose.—Measures have been taken to secure a patent.

New Cooking Range.

Mr. Philip Rollhaus, of this city, has made some very convenient and good improvements on the Cooking Range, which we believe will be found both convenient and good in operation. He has a double oven with flues all around it so that every part will be heated alike, and by the form and construction of the plates, they will, when coal is used, last much longer than others we have seen.

New Shingle Machine.

Mr. J. D. Guseman, of Shippensburg, Pa, has invented a new shingle machine which by one cutter feathers the shingle, points and butts it, and this with a very small amount of power and by a very simple arrangement of machinery.

New Bridge.

The Iris of Niagara Falls, says Mr. Walter E. Hulett of that place, has invented an "Arched Key Bridge," a model of which he has been exhibiting. The model is made upon a scale of half an inch to the foot, which makes the present structure equal to 100 feet span. The arch is supported by 18 wedges or keys running perpendicularly through the arch or sides of the bridge. The flooring is attached to these wedges or keys in such a manner that the greater the weight, the firmer the bridge will be drawn. Is this new?

New Cotton Picker.

By many of our exchanges we perceive that they report on a machine invented down in Tennessee for Picking Cotton. By it a planter is said to be able to pick two thousand pounds of cotton per day from the field doing the work of 20 hands. It is operated by horse power and only designed to gather the upper balls after the lower ones have been picked by hand. We have strong doubts about the possibility of any machine being invented to pick cotton in the field, at least to operate to any advantage.

A Great Gun.

It is reported that Mr. Milo Cass, of Utica, this state has invented a gun that discharges twenty-six times for one loading, which it does in two minutes, or less—the charges being attached to an endless chain. This beats Colt's revolver, and all the other powder-and-lead weapons we have yet read of.

Various plans are afloat in this city to convey goods and passengers to California, but the most prominent is a new balloon not yet inflated except in prospective, which is to go to San Francisco in four days.

Smelting of Copper and Zinc Ores.

The following is an improved flux lately discovered and patented by Charles Lowe, Middlesex, England. The flux is composed of oxide of manganese 42 parts, plumbago 8 parts, nitrate of potash, nitrate of soda, or lime 2 parts and 14 parts of charcoal. The ore is roasted and melted in the usual manner and when in this state, the above composition is introduced into the furnace and well mixed and stirred with the melted ore. The composition is best to be introduced in the form of a powder (ground fine) in the proportion of 25 pounds to one ton of the ore. This flux is said makes the slag rise rapidly which must be skimmed off, when a second dose of the same quantity is introduced and the mass again stirred and skimmed, when farther additions of the flux may be added if necessary, which the experienced smelter will be able to tell, until the copper is ready to be removed and operated upon in the manner usually employed in the manufacture. This flux the inventor says operates to separate the metal from the ore more rapidly than any other heretofore known and more matal is produced, as the slag does not take up so much metal as by the old process.

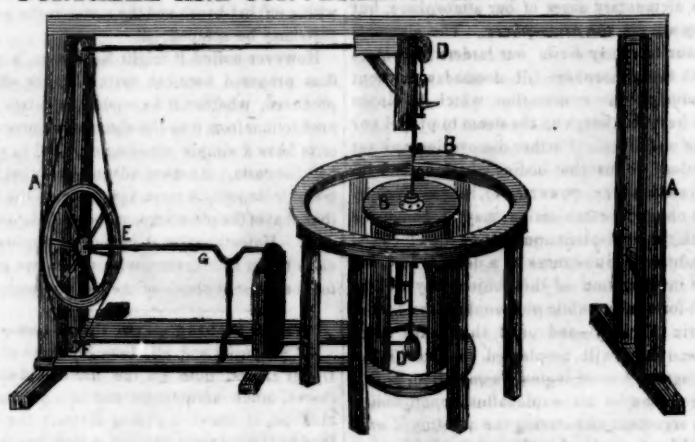
Wool Testing Machine.

Col. Peter A. Brown, of Philadelphia (says the Ledger,) has invented a beautiful little machine for the purpose of testing the elasticity, tenacity and fineness of the wool of different kinds of sheep, a very ingenious contrivance, well calculated to save time and labor in the process of ascertaining the best sorts adapted to various manufacturing purposes. It is purely scientific, and unfailing in its principle as a test of the quality of the wool, and therefore indicates the best breed of sheep to be cultivated by the farmer, and as the best are always the most profitable, it points directly to the interest of all who deal in sheep or wool, either as breeders or manufacturers.

Prevention of Steam Boiler Explosions.

The editor of the Dollar Newspaper says that Mr. R. L. Loyd, of Philadelphia, has applied for a patent to draw off the electricity, as he denominates the explosive agent generated in steam boilers, leaving the active and motive qualities of the steam unimpaired; and even in the total exhaustion of the water in the boiler the machinery is rendered entirely harmless.

PORTABLE AND CONVENIENT SAWING MACHINE.



This is a very neat and convenient arrangement of a small upright saw whereby it can be regulated to operate very conveniently, to cut out curved pieces and a great number of different kinds of wood work.

A A, is a common small frame built to suit the fancy, and to support the shaft. B, is a table, on which a scale may be laid out. C, is a small saw working freely through a collar in the middle of the table. This saw is attached by a screw to a vertical rod above and a like one below, which rods slide in guide eyes as represented above the table and partly seen below. By the way in which the saw is connected to the slides it can be set at various angles as the ends of the saw fit into slits of the slide rods and they can be turned round. The saw is moved by being connected with eccentrics D D on a revolving shaft below and one above, but one revolving shaft will do, if a coiled spring is attached to the upper end of the upper slide. The way in which motion is represented to be communicated here to the main shaft G, is by a stirrup attached to a treddle below to be operated by foot like a hand lathe, the band E passing over the pulleys F F, to move the shafts of the eccentrics D D. There are two or three different ways of arranging the motion gear, and those who are familiar with a lathe will see this at once. But for a mechanic who needs to saw considerable knicknacks of wood and has no power to drive a circular saw, here is an arrangement to work by foot and by which a very rapid motion may be given to the saw, which he may find very convenient to use either as represented or modified to suit circumstances.

Parachutes for Deep Mines.

To descend into mines and coal pits, and to ascend by means of vertical ladders, are operations so fatiguing that the pitmen prefer, in spite of the regulations which forbid it, to expose their lives to the risk of the strength of a rope, which, unfortunately, often breaks and precipitates them to the bottom. Some experiments have lately been made in Belgium on a large scale to remedy the evil and prevent the danger.

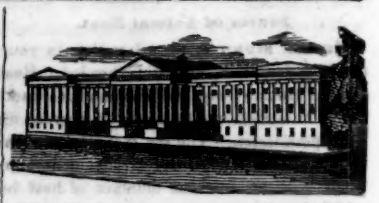
By means of a very simple apparatus, if the rope breaks, the basket, or cuffat, springs out and remains suspended in the middle of the shaft. It is well known that there is always considerable of a current in coal pits, owing to the temperature *below* being *higher* than the temperature above. The Brussels Herald states that trials have been made by means of a working model in a pit of some depth; the apparatus was worked by men who remained suspended in the well when the rope broke short off. The effect of this apparatus was shown before a numerous company, comprised of men of information, the greater part familiar with the working of mines. Their satisfaction was so great that they spontaneously offered to the inventor to make affidavit on the spot of the facts to which they had been witnesses. Among the party was a gentleman who wished the experiment to be tried upon himself; the rope having snapped, he and the workman accompanying him, were spontaneously stayed without feeling the slightest injury or shock.

Collecting the Sewer Water.

The following mode of obtaining "liquid manure" is now resorted to by the London Sewerage Manure Company:—A barge of peculiar construction, fitted with enormous tanks and a powerful steam engine pumping apparatus, is moored on the north bank of the Thames, near the foot of Hungerford bridge, and immediately contiguous to the great sewer that here discharges itself into the river.—At low water the people on board pump the sewer water into the tanks, which are capable of holding about fifty tons. This water possesses greater irrigating power than more solid manure, and is said to be worth to the agriculturist about $50 per ton.

Fragrant Odor for Sick Rooms.

A few drops of oil of sandal wood, which though not in general use, may be easily obtained, when dropped on a hot shovel will diffuse a most agreeable balsamic perfume throughout the atmosphere of sick rooms or other confined apartments.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending February 6, 1849.

To James White, of Milton, Penn., for improvement in Cooking Stoves. Patented Feb. 6, 1849.

To John A. Roebling, of Saxonburg, Penn. for improvement in tops for Wire Ropes. Patented Feb. 6, 1849.

To G. B. Whiteside of Brockport, N. J., for improvement in Cooking Stoves. Patented Feb. 6, 1849.

To William Pedrick and T. M. Melvin, of Charlestown, Mass., for improvement in machinery for Spinning Hemp. Patented Feb. 6, 1849.

To Elijah Learned, of Boston, Mass. for improvement in Hoisting Apparatus. Patented Feb. 6, 1849.

To Elisha Vance, of Wilmington, Ohio, for improvement in Cooking Stoves. Patented Feb. 6, 1849.

To John B. Chollar, of West Troy, N. Y., for improvement in plates for boiler holes and tops of Stoves. Patented Feb. 6, 1849.

To Henry Peeler, of Boston, Mass., for improved method of Boring Gun Barrels. Patented Feb. 6, 1849.

To William Cobb, of Albany, N. Y., for improvement in Cooking Stoves. Patented Feb. 6, 1849.

To Jesse Fitzgerald, of New York, N. Y., for Bolt and Disk Sectional Cannon. Patented Feb. 6, 1849.

To Thomas J. Tuthill, of Elmira, N. Y., for improvement in Rotary Cutter Ploughs.—Patented Feb. 6, 1849.

To Horatio Allen, of New York City, for Adjustable Lever Cut-off with secondary Toe (2 patents.) Patented Feb. 6, 1849.

To Henry W. Holly, of Stamford, Conn, for improvement in Music Stands. Patented Feb. 6, 1849.

To Philander Shaw, of Abingdon, Mass. for improvement in Cutting Boot Heels. Patented Feb. 6, 1849.

To Isaac L. Bennet, of Westerlow, N. Y. for Piston Valve enclosed in the Steam Cylinder. Patented Feb. 6, 1849.

To Elliot & Abbott, of Philadelphia, Pa., for improved Lever Scale for Canals, Railroads, &c. Patented Feb. 6, 1849.

To William H. Start, of Smyrna, Del., for improvement in Dumping Wagons. Patented Feb. 6, 1849.

To Morey & Johnson, of Boston, Mass. for improvement in Sewing Machines. Patented Feb. 6, 1849.

To Jos. S. Cloud, of May's Landing, N. J. for improvement in Ploughs. Patented Feb. 6, 1849.

To Lansing Kellog, of Ravenna, Ohio, for improvement in Cheese Presses. Patented Feb. 6, 1849.

To Cyrus P. Doty, of Courtland, N. Y. for improvement in coloring Bricks. Patented Feb. 6, 1849.

To Edwin B. Horn, of Boston, Mass. for improvement in Camphene Lamps. Patented Feb. 6, 1849.

To William Jewell, jr. of Williamsburg, N. Y. for apparatus for ascertaining by inspection the saltness of water in Steam Boilers.—Patented Feb. 6, 1849.

To Warren S. Bartle, of Newark, N. J. for method of regulating the supply of water to Steam Boilers. Patented Feb. 6, 1849.

Horse Skates.

A writer in the National Intelligencer mentions the invention of Horse Skates by means of which, in the cold latitudes, an ordinary horse has been known to travel as much as an hundred miles in the short space of three hours without apparent fatigue. A full set (he says) of these marvellous skeats, bedecked in the Norwegian style, has been desposited in the Patent Office.

NEW YORK, FEBRUARY 17, 1849.

National Railroad to the Pacific.

Since our goverment took possession of California and came to know something of the genefal value of that beautiful and rich country, the necessity of opening up a channel of easy communication between it and the old States, has become obvious to all—both rulers and people. At first a line of steamships was only suggested as the most possible and probable means of keeping up the quickest and most regular communication. But as soon as the golden news reached us, the swift winged steamboat appeared as a too tedious messenger to carry mails or hardy emigrants through the Straits of Magellan or around Cape Horn. Within a few months various schemes to construct Railroads from the Atlantic to the Pacific have been proposed to our goverment.—Last year the proposition of Whitney to construct a Railroad to Oregon, commencing at Chicago or some other port on the Lakes, occupied considerable attention of the U. S. Senate, but in this session of Congress it is lost sight of amid the tumultuous schemes presented to construct Railroads through the Isthmus of Panama, the Isthmus of Tehuantepec, and a great National Railroad from St. Louis to San Francisco The Isthmus of Panama belongs to the government of New Grenada, but the right of way through it to the Pacific, has been granted to the United States. The Isthmus of Tehuantepec belongs to Mexico, but we believe that government is willing to grant the right of way to the United States for half a century, with the right of our citizens to settle and occupy lands on each side of a railroad, if constructed through it. The route of the proposed National Railroad is through territory belonging to the United States. The Isthmus of Tehuantepec is allowed to be by far the best route, but the objection to that route is, "it is in an enemy's country." Our opinion is, that the route through Tehuantepec should be secured by our government, if easily acquired, at once, and that a plank road like an old Roman highway be immediately commenced likewise through the territory of Missouri to San Francisco. By having a Railroad through Tehuantepec to the Pacific, we may expect that without any more war, a State would be formed in the heart of Mexico that would in twenty years petition to be admitted into the Union. The nature of our race is to spread out like a fan—it has an all conquering colonizing energy and the most politic means that are adopted to facilitate the spread of our race in a peaceable manner, are surely the wisest. The principle of colonizing should be, to let the people go up like the patriarchs of old "and possess the land," and if possible without strife between those who have a right to cultivate the soil for their daily bread. It will indeed be a beautiful scene to behold our Great Republic standing with one foot upon the Atlantic on the east, and the other on the Pacific on the west, and stretching out her hands to the north and south to come and take shelter under her peaceful banner, when all her citizens shall live 'mid "peace and plenty, each under his own vine and fig tree none daring to molest or make him afraid."—Is this a state of civilization too high to be attained by any people or nation? Surely not. It is a state at least not too high to aim at.—One grand means to bring it about, is a ready means of communication between all parts of our country and all parts of the world. No one, we believe, will doubt this. Let us therefore, commence without loss of time, a National Railroad to the Pacific, and one through the Isthmus of Tehuantepec as soon as the preliminaries are arranged, which we hope will be at no distant date from this.

It is proposed to tunnel the Blue Ridge, in Augusta county, Va., to allow a Railroad to pass through it.

Reform in the Patent Laws.

Ex-Governor Seward, in a very able letter to the Hon. W. B. Maclay recommends the following new Patent Bill which would effect a complete revision in the Patent Laws.

The first provision is, that any person interested may, on proper notice, at any time, in a proper tribunal, prosecute an action for repeal of any patent, and that such repeal shall render the patent absolutely void.

The second is, that after a patent has been sustained by one verdict and judgement in an action at law, it shall be deemed conclusive in all such actions brought afterward, until the patent shall have been repealed.

The first provision will enable us to sweep away, by a single trial, any patent which has been improvidently granted. The second will enable an inventor whose patent has been justly granted and judically established, to enjoy its benefits, subject to the rights of all parties interested to impeach it in an action of repeal, but not elsewhere.

The practice of defending suits which we now have, is the same which very properly obtained in England, because Patents are always granted there without previous examination by the Government. The law was the same in this country until the act of 1836 was passed. Since that time, all applications are regularly examined. Not less than three-fourths of all applications are rejected. The Patent is now a sanction by the Government itself, of the originality of the invention and of the sufficiency of the specification. It would be in harmony with the law, to make the patent thus solemnly awarded, conclusive until it should be repealed by a competent tribunal. But the bill submitted does not go so far. It proposes only that after a Patent has been established in one fair trial at law, brought by the Patentee, litigation shall cease except in the direct way of an action to repeal the patent.

We know one inventor in this city who has had a patent for a Cracker Cutting Machine, and has had it reissued corrected by an Ex-Examiner of the Patent Office. We believe him to be the real orignal inventor and yet his patent is infringed every day. It has been a great loss to him and it is a shame to see Patents thus so lightly trod upon. We believe that there is just as much necessity for a reform in taking evidence and in trying Patent cases before the Supreme and District U. S. Courts, as there is for a change of Law.—There are but precious few patentees who can pay the fee for such counsel as Seward or Webster. Now it would be far better to have infringement cases decided by Jury, just upon reading the evidence, without any spouting of counsel whatever.

Patent Evasions.

We understand that petitions to Congress are in circulation in Rochester, for protection against evasions of American inventions and patents by persons in Canada. There is no remedy for this but to carry out the suggestion of Mr. Burke in his Report for 1847, viz. to endeavor to get other governments to reduce their patent fees and make them about equal with the fee in the United States. In England every person, citizen and stranger pay the same price and are treated alike, but the price is too great for mechanics to pay.—We should like to see a good and mutual understanding between all governments to protect inventors in their rights, and certainly there is a necessity for such protection between the United States and Canada, especially for machines working in any manner in wood.

The First Daily Newspaper in Upper Canada.

We see by the Tribune of Friday last, that the first daily newspaper in Upper Canada has just been started by Dr. Barker. It is called the Daily British Whig. The Tribune states that in Scotland with a population of 3,000,000 there is not a daily newspaper. We have seen the same statement made in some other papers and by some *correspondents* to newspapers here, from London. This is different from what we know of the matter, as we sometimes get the North British Daily Mail, published in Glasgow by a brother of Allison the Historian.

Remarks on the Archimedian Water Wheel.

Mr. Editor.—As there are great differences of opinion in reference to some kinds of water wheels I would desire to offer a few remarks on the Water Wheel noticed in No. 14 Scientific American, Page 108 "constructed on the screw principle, the height of the wheel being nearly equal to the fall of water and the spiral extending from top to bottom of the cylinder."

Suppose the spiral wound ten times around the shaft; then, if the water acted equally through the whole length of the spiral, the power would in effect be divided into ten equal parts, operating throughout the length of an inclined plane, equal to the length and inclination of the spiral, and, with only one tenth part of the force upon each circumference of spiral, now if the spiral only wound once around the bottom of the shaft; or a little more, with the inclination so varied as to give the issue a funnel shape, such as to conform with the contraction of the vein of water; and also to cause the water to issue out of the wheel in a direction parallel with the inclination of the spiral: then the whole head of water would be brought to bear upon the one circumference of spiral, and with ten times the intensity that it would if it were equally supported upon ten circumferences of spiral plane, consequently by the principles of the lever and inclined plane, the power would be equal in both cases. Suppose again a ball of ten pounds rolled down an inclined plane;—would it not produce as much reaction upon the plane as ten balls of one pound each? Or if ten levers were, with central fulcrums, attached at one end to the ten pound ball,—would not that ball balance the ten one pound balls, if suspended one upon the opposite end of each of the ten levers, the same as it would if suspended upon one lever, with the ten small balls upon the opposite end? The principle seems plain. Then it is no improvement over many wheels now in use; nor do I consider it as good as many; for the friction caused by running through so long a conduit, and that of the spiral form, causing the water continually to rush against the sides of the surrounding cylinder, the revolutions of which by virtue of centrifugal force, cause the water to press outwards against the cylinder; and, consequently, diminishing the pressure on the inferior side of the spiral, as well as to create more friction on the interior of the cylinder, thereby creating a clog to the water. As to the cost of construction, it must be more than many excellent wheels now in use, for a cylindric revolving case, and spiral of such a length, must cost much more than a short wheel with a stationary case; in either case there would have to be a circle for the wheel to revolve in. As for the diameter of the wheel, in proportion to the power, it would have to be as great, if not greater, than many wheels now in use. Now, I have not written the above with any ill will or desire to injure any one, much less the inventor of the application; but have merely written some of my views on the subject, which I think I would be borne out in by an experimental test, and further, I would say that I am a searcher after truth, and consider it but an act of simple justice to myself as well as others, to express my views on such subjects, for it is a matter of great importance to many that Millwrights should understand and see these things in their true light. If any man thinks my arguments are incorrect, or founded in error, I would thank him to refute them through the medium of your excellent paper, and if he will maintain the position assumed in the article referred to viz. that there is an increased power obtained by extending the length of the screw, from the bottom nearly to the top of the fall, in all cases; I will, by the same rule of argument, prove the practicability of obtaining a perpetual motion; or, in other words show how a water wheel can be made to pump back all the water it uses, and still have a power left to drive machinery, which would be out of the question.

Yours truly, A Practical Man.

Penn. Jan. 29, 1849.

Ladies who appear in society in mourning or half mourning in England, now adopt the plan of decorating it with scarlet.

Apprentices and Factory Operatives.

The following "Act to Protect Apprentices and Operatives in Manufactories," is now before our Legislature:

The People of the State of New-York, represented in Senate and Assembly, do enact as follows:

Section 1. It shall be the duty of every employer having apprentices in his service, to cause them to be instructed in reading and writing.

Sec. 2. Any apprentice over thirteen years of age, who shall be unable to read and write, after having served as such apprentice for two years, shall be free from his indentures.

Sec. 3. No child shall be employed in any cotton, woolen or other manufactory or workshop within this State who shall not have attained the full age of ten years, and be able to read and write.

Sec. 4. It shall not be lawful for any child who shall not have attained the full age of thirteen years to labor in any manufactory or work shop, more than five hours in any one day, provided such child be employed throughout the whole year.

Sec. 5. When such employment shall not continue more than eight months in any one year, the provisions of the proceeding section shall not apply, but no child shall under any circumstances labor more than ten hours in any one day.

Sec. 6. It shall not be lawful to employ any child under sixteen years of age in any manufacturing labor during the night, that is to say, between the hours of eight o'clock in the evening and five o'clock in the morning.

Sec. 7. The penalty for a violation of any of the provisions of this enactment, shall be ten times the usual wages for every day during which any child may be wrongfully caused or permitted to labor, to be recovered from the employer or employers, by the parent or next friend of such child on due proof before a justice of the peace.

Sec. 8. This act shall take effect on the first day of July, one thousand eight hundred and forty-nine

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Telegraph to Liverpool.

Dr. Jones, the telegraphic reporter in this city, has come out with an elaborate plan for constructing a telegraph between New York and Liverpool, along the bottom of the Atlantic Ocean. We noticed in our last that an appropriation had been asked of the Senate to try experiments. Some chaps will be asking for an appropriation by and bye to construct a floating railroad to Liverpool, Cork or some such place.

Another Good Move by Congress.

The House of Congress, having abolished flogging in the Navy, have followed up the good movement by abolishing the grog ration, which is two gills a day. In place of this the sailor is to receive four cents. Mr. John A. Rockwell, of Connecticut, has the credit of this act, and Mr. Sawyer, of Ohio, the credit of the former. If the Senate confirm these proceedings, we shall soon see a desirable improvement in the character of the Navy.

Back Volumes of the Scientific American.

A few more copies of complete sets of vol. 3 of the Scientific American may be had at the office, either bound or in sheets. Price neatly bound $2 75, in sheets suitable for mailing $2. The second volume minus 4 numbers from being complete we can furnish for $2 bound, or in sheets and mailed at $1 50. Send in your orders early if you desire them filled for we have but a few more copies left of either volume, and the number is growing less every day.

Archimedes.

This extraordinary man was a native of Syracuse, a city of Sicily: and, according to the most authentic accounts, was born about 288 years before the birth of our Saviour, and about 50, though some say 100 years, after the much-famed Euclid. Who his parents were, and what was their rank in life, are not particularly known: though it is, on all hands acknowledged, that he was paternally related to Hiero, the king of Syracuse. It is said that Hiero considered himself greatly honored by such relation; and there can be no doubt that royalty has more cause to boast its alliance to genius, than genius to be elated by its connection with royalty. It is probable that the name of the monarch would have been long ago sunk in oblivion, had not that of the philosopher served to float it along the stream of time to the present day. By whom he was instructed in the elements of education and what was his progress, history fails to inform us: but it tells us, that he became ardently attached to the study of mechanics and geometry; and that, for the sake of these tranquil pursuits he contemned the prospect of wealth and honour, which was presented to his view by his connection with monarchy. The beauty of mathematical demonstration, and the great efficacy of mechanical power, had, for his mind, more charms, than the glitter of courts, or the conquering of cities and provinces.

After studying at home, probably till he had exhausted all the scientific knowledge which the place could afford him, he repaired according to the prevailing custom of the age, to Egypt, that he might more successfully prosecute in Alexandria, what he had so happily begun in Syracuse. Egypt, if not the birth place of the sciences, was at least the place where, at that time, they were most effectively taught; and was the great theatre of learning, to which persons from all quarters, but particularly from the different provinces of Greece, regularly resorted. We are unhappily left in the dark, with regard to the length of time he remained in Egypt; but we are informed, that during his stay he applied with assiduity to his favourite studies, and distinguished himself by some singular inventions. During his residence upon the banks of the Nile, he enjoyed the society and friendship of some of the most distinguished characters of his day, but especially of Conon, a famous mathematician of the island of Samos. Their friendship being founded upon their love of science, the most disinterested of all friendships, without the appearance of the slightest jealousy, they had a mutual esteem for each other's talents and attainments, and often submitted problems to each other for solution. Having enriched his mind with the intellectual treasures of Egypt, he at length revisited the land of his nativity, that his countrymen might share in the fruits of his exertions.

Some of the most ardent admirers of Archimedes, have maintained, that he imparted to the Egyptians, as much as he received from them; but this is nothing but mere assumption, and, therefore, entitled to little attention. Whatever benefit he conferred upon the Egyptians, there can be no doubt, that the people of that country were, long before that period, in possession of arts and inventions, which had enabled them to accomplish works, which, with all our modern improvements in mechanics, might not a little try the skill of the present day.

Archimedes, after his return to his native city, is said to have relaxed neither the vigor of his pursuit after knowledge, nor yet the intensity of his application. His studies were the engrossing objects of all his thoughts. He not unfrequently prosecuted them to the almost total neglect of his person; food and sleep were often sacrificed to the perfecting of some mechanical invention, or the solution of some difficult problem. To prevent the ruin of his health, his servants were sometimes obliged to interpose physical strength, in order to compel him to recruit his exhausted system by air, exercise, and the use of the bath. His devotion to the study of mechanics stands almost without a parallel. Hiero at one time expressing his admiration of some of his inventions, Archimedes replied, with enthusiasm, that he required but a place to fix his machines upon, to be able to move the earth itself."

Thus passed the days of this wonderful man in the peaceful bowers of philosophic seclusion, till the safety of his native city, drew him from his retirement, and prompted him to engage in its defence During the protracted struggles between the Romans and the Carthaginians, the Silicians, and especially the Syracusans, had remained for a long time either neutral, or in alliance with the Romans At length, from some political movements in the city, the Carthaginian interest gained the ascendancy, and attempts were made to extend it over the rest of the island. So soon as the news of this reached Marcellus, the Roman general, he hastened with a strong force into Sicily, and after having reduced several other places to subjection, he determined to lay siege to Syracuse. Here the successful career of the Roman conqueror met with an unexpected check. The inventive genius of Archimedes, enabled the Syracusans to baffle all the efforts of the besiegers, for the space of three years. Never before was so happily illustrated the admirable sentiment, that "Knowledge is power." He so improved the warlike instruments for the discharge of missiles, as to spread consternation and dismay throughout the enemy, who were more than once, on the point of retiring from the siege, believing that the city was defended by the gods. By means of long and powerful levers, together with grappling irons he is said to have destroyed many of the Roman galleys, when they approached the walls of the city; and when they retired for safety, to a great distance, to have inflamed them by a particular combination of burning glasses. The reports of these achievements of Archimedes having been transmitted to us chiefly by the Romans themselves, there is no doubt that the difficulty they felt in reducing the city, caused them to magnify the obstacles which he opposed to their success, in order that no impeachment might be brought against their courage. But whatever allowance may be made for exaggeration, it cannot be doubted, that science and art gained a noble triumph on this occasion.

The city, if it could have been taken at all, might, it is said, have resisted the assaults of the enemy for a much longer time, had not the success of the besieged lulled them into a fatal security.

During the celebration of a festival in honor of Diana, in the midst of their indulgencies, overlooking the safety of the city, they neglected to place guards on some particular part of the walls; and the Romans observing this, and taking advantage of the supineness of their adversaries, scaled the ramparts, and quickly made themselves masters of part of the city. Their chief difficulties being now surmounted, after a few vigorous efforts, they gained possession of the whole city. Amidst the plunder and carnage which ensued, sad to relate! Archimedes did not escape, though orders had been given by the Roman general for his safety and protection. Various accounts are given of the circumstances of his death, though they all agree in ascribing the merit of his horrid deed to a Roman soldier. Some say, that he was slain in his study, while engaged in solving a problem, in consequence of his hesitating to obey the imperative command of a soldier to accompany him to Marcellus, till he had completed its solution. Others say, that he was put to death in the streets, while he was drawing mathematical figures in the sand. A third report states, that he met his unhappy fate, while bearing some boxes of mathematical instruments to Marcellus, and that the perpetrator did the deed without knowing who he was, persuaded that the boxes contained some valuable treasure. This mournful event happened about 210 years before the Christian era, and when Archimedes, notwithstanding his intense application to study, had reached the advanced age of 75 or 76.

Marcellus was inconsolable at this event; and, to make all the reparation in his power, he sought out his relatives, and distinguished them by every mark of attention. The Roman paid the last debt of nature to the remains of him whose loss he deplored, and erected on his tomb a monumental stone with a suitable inscription, and some figures engraved upon it, emblemative of his discoveries as a geometrician.

The Effect of Steam on Timber.

Mr. Violitter has lately presented to the Academy of Science in Paris, a very able communication on the dessication of different kinds of wood by steam. He stated that steam raised to 482° Fah. was capable of taking up a considerable quantity of water, and acting upon this knowledge he submitted different kinds of oak, elm, pine and walnut, about 8 inches long and half an inch square to a current of steam at 7½ pounds pressure to the square inch, but which was afterwards raised to 482 degrees. The wood was exposed thus for two hours. It was weighed before it was exposed to the steam and afterwards put into close stopped bottles until cool, when the samples of wood were again weighed and showed a considerable loss of weight, the loss of which increased with the increase of the temperature of the steam. For elm and oak the decrease in weight was one half ash and walnut two fifths, and pine one third. The woods underwent a change of color as the heat was rising from 392 degrees to 482, the walnut became very dark, showing a kind of tar, formed in the wood by the process, which was found to have a preserving effect on the wood.

It was found that wood thus treated became stronger—having an increase in the power of resisting fracture. The maximum heat for producing the best resisting fracture power for elm was between 302 and 347 degrees, and between 257 and 302 for the oak, walnut and pine. The oak was increased in strength five ninths, walnut one half, two fifths for pine, and more than one fifth for elm. These are but preliminary experiments which may lead to very important results, and are therefore interesting to architects especially. By this process, the fibres of the wood are drawn closer together, and maple and pine treated in the steam to a temperature of 482, were rendered far more valuable for musical instruments than by any other process heretofore known. This is valuable information to all musical instrument makers—who knows but this is a discovery of the Venitian fiddle maker's great secret.

An Accomplished Woolen Draper.

Among the numerous candidates for the office of librarian to the Advocates' Library, Edinburg, Scotland, vacant by the resignation of Dr. Irving, is Mr. Samuel Halkett.—This gentleman has acquired an extensive knowledge of philology and can not only read and speak most of the living languages of Europe, but has a profound acquaintance with the Eastern tongues, including Hebrew and Arabic, while his translation of scientific papers in Swedish, Norwegian, and Danish, have been much appreciated. The most singular circumstance connected with the history of Mr. Halkett is his application to a business during the whole period of his life that might be considered uncongenial to his literary pursuits, being of the firm of Harrison and Halkett, woolen drapers, North bridge. He now seeks for a situation which is more suited to the cultivation of his singular powers.

Singular Discovery in Turkey.

The Constantinople Journal gives some curious details regarding a city said to have been discovered in Asia Minor by Dr. Brunner, one of the agents employed by the Government of the Sublime Porte of the Empire for the purpose of taking a census. While occupied in exploring the sandjak (excavations) of Bousouk, on the confines of Pontus, Cappadocia, and Galatia, Dr. Brunner, whose attention was attracted by the bold and curious passages opened into the living rock, was accosted by a villager, who offered to show him things far more interesting on the other side of the mountain if he would trust to his guidance. After some hesitation, the Doctor armed himself, and followed his guide, taking his servant with him. Half an hour brought them round the mountain, and then the Doctor found himself, says the narrative, in presence of the ruins of a considerable town.—These ruins are situated in the south-east part of the village of Yankeni, and to the north of the village of Tscheque, half a league from each other; and the Doctor's profound study of all accounts, ancient and modern, of Asia Minor furnishes no trace by which he can identify them. The site of the town is half a league in length. It contains seven temples with cupolas and 218 houses, some in good preservation, others half choked up with their own ruins and with vast fragments of rock detached from the overhanging mountain. The houses have compartments of three, four, and six chambers The largest of these edifices is 20 feet long by 28 wide. So far as the ruins would permit the Doctor to estimate it, he conjectured the height of some of the temples to be from 20 to 30 feet. There are traces of plaster on the interior walls, but not an emblem or indication, says Dr. Brunner, to suggest the origin or date of the ruined city. Dr. Brunner proposes his deserted city as a puzzle for the Archæolegists.

Enormous Application of the Electro-type Process.

An enormous application of the electro-type, or galvano-plastic process, has been made in the sculpture of the Cathedral of St. Isaac at St. Petersbug, Russia, by the architect. After having made very important experiments, he was authorized to adopt this mode in the execution of the metallic sculptures and carvings for the following reason: 1. The identical reproductions of the sculptures without chiselling. 3. The lightness of the pieces, which enabled the architect to introduce sculptures of higher relief than any hitherto known, and to fix the pieces suspended from the vaultings, without fear of accident, or of their being detached 2. The great saving of expense between these and casting in bronze. The gilding also was effected by the same process, and presented equal advantages. The seven doors of the cathedral will be of bronze and electro-type, the frame work being of the former and the sculptured parts of the latter. Three of these doors are 30 feet high, and 44 feet wide the four others 17 feet 8 inches wide They contain 51 bas reliefs, 63 statues, and 84 alto-relievo busts, of religious subjects and characters. The quality of metal employed in the dome is as follows: Ducat gold, 247 lbs.; copper, 42½ tons; brass, 321½ tons; wrought iron 524½ tons; castings 1068 tons. Total—1966½ tons.

Roman Catholic Statistics.

The Catholic Almanac, published in Baltimore, and which is generally recognized as good authority, represents no increase in the Roman Catholic dioceses of Baltimore, New-Orleans, Louisville, Boston, Philadelphia, New-York, Charleston, Mobile, Detroit, Vincennes, Natchez, Pitsburgh, Little Rock, Milwauke, Albany, Galveston and Buffalo, while in the diocese of Cleveland there has been an actual loss of 5000 from the last year's computation of 30,000. The only green spots in this wide-spread desert, says the Freeman's Journal, are, the diocese of Cincinnati, where there has been an addition of 15,000 to the 50,000 of last year; Dubuque, where there is a gain of 500 on the former sum of 6,500; Nashville, where the last year's number of Catholics has doubled, being now 3,000, while it was only 1,500 a year ago; Chicago, where 3,000 have been added to the 20,000 of last year, and Oregon, with the parts adjacent, where 7,500 had grown up to 8,100, being a gain of 600—Indians and others. The Almanac represents the total decrease of Roman Catholics in the United States during the the year as being one hundred and nine thousand four hundred; and the present number of the denomination in this country as 1,276,300.

Fluency of Speech.

"The common fluency of speech, in many men and women, is owing," says, Swift, "to a scarcity of words, for whoever is master of language, and hath a mind full of ideas, will be apt in speaking, to hesitate upon the choice of both; whereas, common speakers have only one set of ideas, and one set of words to clothe them in, and these are always ready; so people come faster out of church when it is nearly empty, than when a crowd is at the door."

TO CORRESPONDENTS.

"J. R. Gardner of Va."—Mr. Wilder's pamphlet is not for sale. There is a work called Armstrong on Steam Boilers, price $3, which will give you all the information. The examples you refer to are correct, but a continual pressure of steam is like the action of a battering ram on a wall, therefore a low pressure is the only continued safety. You will see that one eighth of an inch is the square root of 64, and you can calculate the decreased thinness of sheet iron.

"W. D. M. of Miss."—We have received the letter accompanied by a description of your improved "Submerged Water Wheel." We cannot express our full opinion of its merits without a better opportunity of examining it, than the one furnished by you. The results of actual experiments, are always best, and yours must have been highly satisfactory. Inasmuch as you solicit our advice, we give it by saying, that if you intend to secure it, you should lose no time in completing a model and forwarding the same to this office.

"H. D. A. of N. Y."—You may rest assured that the house to whom you addressed the enquiries, will deal with you in an honorable manner. Their instruments stand No. 1, wherever they have been tested. The prices vary from 12 to 18 dollars according to size, &c. If desirable we will attend to the business for you.

"W. W. S. of Ohio."—It will require an engine of 28 horse power to drive 2 run of 4½ feet stones for wheat—at the speed they should be driven. It will require one boiler 27 feet long and 48 inches diameter for the engine, and it will consume 3 and a quarter cords pine wood in 12 hours. This is a boiler with a return flue and steam at 50 pounds. We think 2 boilers better than one for coal but not for wood. It is best to have power enough, so as not to strain the engine.

"J. L. of———"—Yours will appear next week. It is on a very interesting subject, and well handled.

"T. N. of Ohio."—It is not easy to tell how you have combined the lever and square, but if you look through your back numbers Vol. 3, you will see two drawings of such kind of tools. We know of no other tools of the same nature than the ones we refer to.

"C. and H. H. of Va."—The machine you refer to is sold. There is no patent now on it. It requires 4 horse power to drive it, but its actual product we cannot at present tell.

"H. T. S. of Ohio."—We will have to give yours some more attention. At present we think we have seen its equivalent before. There have been quite a number of inventors to accomplish the same thing. The crank with a fly wheel cannot be bettered.

"J. W. C. of Ind."—Yours is a good invention, but we would find it difficult to institute the claim, we will give it more attention.

"A. B. of Va."—We have received yours and will answer soon.

"L. M. W. of N. Y."—The hydraulic rams are of different prices, from $20 to 50 and $60. There is scarcely any limit to the height they throw. It all depends upon the supply, its height, and the quantity discharged or the smallness of the bore of the discharge pipe. It will raise one twelfth the water to ten times the height of the fall which supplies, one 24th the water 20 times the height of the fall, &c. We shall attend to your other request.

"L. W. M. of Ct."—The latest work on Galvanism is the numbers of the Encyclopedia of Chemistry, now in the course of publication by Cary & Hart of Philadelphia. It describes different kinds of batteries. There is a work published by Walker,—a London work, which is somewhat expensive, but is a capital one on Electrotype, &c. You could get it through one of our importing Book Houses. It must be prepaid.

"J. M. H. of Va."—Why do you continue to trouble us with matter in which we have no concern; this is the 5th letter from you within 3 months. We must reply by referring you to our letter of the 13th of August last, wherein we directed you as plain as A B C. Any communication having a shadow of resemblance to what we are engaged in, will receive due attention. Mark that.

"W. C. H. of Vt."—Your case will be taken up immediately upon the receipt of the model. The funds are O. K. and will be appropriated according to your directions. As early as next week, we shall probably find time to examine your new plan, the result of which due advice will be given. We must acknowledge, however, that (from a hasty glance at the drawings) we think the principle wrong.

"A. W. of Me." "T. E. S. of Pa."—Your models have arrived. You will hear from us in a few days by letter.

"S. P. & J. A. U. of Ohio."—Your model should have arrived ere this. There must be remisness somewhere—look to it. The letter came in due time.

"D. S. R. of New Bedford,"—Is respectfully notified that it will be impossible for us to notice his instrument unless he can furnish his full name, and a clear description of its construction and operation. A moments reflection will satisfy him of the truth of the above suggestion.

"H. C. B. of Ohio."—The drawings and explanation of your improvement in stoves, has been received and examined. Its value is unquestionable if it operates as you describe, fully sufficient in point of novelty to warrant you in making application for Letters Patent. A model is all we require to decide upon its merits.

"H. J. B. C. of N. C."—Your Vol. is now in the hands of the binder, and will be completed next week. You will receive it soon.

"S. K. Jr. of Mass."—Your communication has been received, but your name does not appear upon our books, however we have entered you for 6 months, and placed the money to your credit. The Patent Office is somewhat behind in their business, but you may expect to hear from the Commissioner soon.

"L. B. L. of Vt."—Your enquiries are so inexplicit, that we are unable to answer them satisfactorily and we regret that necessity compels us to reply to you in this manner, as we always choose the opposite course with our correspondents. The price of the article you refer to is not familiar to us.

"C W. T. of Wis."—We know nothing of Mr. Brewer's whereabouts, but think very favourable of his machine. If we can possibly ascertain his address you shall be duly advised.

"J. R. M. of N. Y."—Your communication is inadmissible.

"R. V. N. of N. Y."—Your business will be attended to immediately.

"C. R. of Ohio."—The best thing you can do to bring your invention before the public, is to get a cut and description of it published in the Scientific American. Price only $6. Who can know about it unless you publish, and there is no medium so good as the one we recommend.

Crushing of an Iron Bridge.

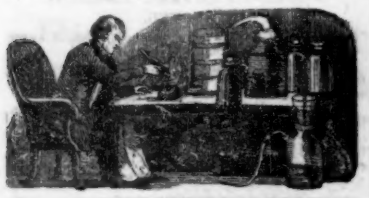
The iron Bridge over Buffalo creek broke down last week under the test applied. Thirty-five tons were placed upon it, when it sank easily to the scaffolding, about two feet below it, where it rested. It is therefore a failure, and will have to be replaced by another structure. The span—160 feet—is the longest, we understand, of any ever attempted in this country. Some ascribed the breakdown to the frost in the iron, but others think it is owing to a defect in the plan of construction, as not being adapted to so long a reach.

Persons desiring good likenesses of themselves, had better call upon our friend Gurney, 189 Broadway. He merits, as well as receives liberal patronage.

Advertisements.

☞ This paper circulates in every State in the Union, and is seen principally by mechanics and manufacturers. Hence it may be considered the best medium of advertising, for those who import or manufacture machinery, mechanics tools, or such wares and materials as are generally used by those classes. The few advertisements in this paper are regarded with much more attention than those in closely printed dailies.

TERMS:—CASH IN ADVANCE.



For the Scientific American.

Copper as a Poison.—Tests.

The chemical tests for salts of copper in a state of solution, are ammonia which produces a pale blue precipitate. Sulphuretted hydrogen makes a dark brown precipitate. Ferrocyanide potassium produces a claret precipitate. A slip of bright polished iron soon becomes coated with it, like a penknife dipped into ink made with blue vitriol and logwood, or if a drop of the suspected liquid is placed on a strip of silver and touched with a zinc wire, the copper is at once deposited on the silver, if there be any in the solution.

The salts of copper have two poisonous properties, commonly known as blue vitriol and verdigris The former is a sulphate—the latter a subacetate. If in any suspected liquid a clean needle be suspended for two hours, and no red coating be noticed on the needle, it is a sign that no detectable quantity of copper is present. Mr. Taylor says that he dissolved one third of a grain of the sulphate of copper in water and mixed the solution with four ounces of thick gruel, and by a trial with ammonia, no effect was produced,—no blue precipitate formed, but by adding a few drops of weak sulphuric acid and suspending a bright needle in it for 24 hours by a thread, he found that it was covered with a distinct film of copper and thus the quantity of copper present was less than the six thousandth part of the solution. But in cases of poisoning, the copper may be present in union with the *mucous membrane* of the stomach and in that case insoluble, or it may be in intimate union with some organic principles and in that case exhibits no appearauce in the liquid. To examine the solid parts of the body in which copper is suspected to have acted poisonously, there are prescribed processes in all works on chemical analysis, but the whole of the processes have been subject to objections, as Devergi, Henry and Orfila assert that they have detected traces of copper by the process of incineration in the bodies of animals which were not poisoned by copper. On the other hand Flandin positively denies that copper is ever found natural in the human body. An extensive enquiry into this subject was made not long ago by M. Boutigny, whose name is associated with some late experiments in the steam engine. He states that he had traced the presence of copper in animals that had been accustomed to receive food prepared in copper vessels, but this is disputed by others, who assert that the copper might be traced to the filtering paper. On this point then, there is still doubt. The most common cause of poisoning by salts of copper, is by food prepared in copper vessels. Pure water may be kept for any length of time in a clean copper vessel without becoming impregnated with the metal, if the air be excluded, but if the air has access a hydrated carbonate mixed with the oxide is gradually formed. Water containing salt or saline matters soon become impregnated with copper if kept in such a vessel. Falconer says that neither milk, tea, coffee, beer nor potatoes exert any action upon being boiled in a clear copper vessel, but if the vessel is not thoroughly clear, acid substances will dissolve the carbonate that encrusts the vessels. All greasy matters left in contact with copper, soon become impregnated with it. Lemons and other fruit which are used to make preserves, may be boiled in a copper vessel without being impregnated with the metal, but they should never be let to cool in the copper vessel, as in that slow process the metal is sure to be acted upon. No acid substance for use should be boiled in copper vessels, neither pickles, nor fruit, brass pans are the best for this purpose. Copper tea kettles are all tinned and, whenever the tinning is destroyed by any means, it should be renewed as soon as possible. The sulphate of copper has been used in the fermentation and adulteration of liquors, this is the crime which should be severely punished. German silver contains a considerable portion of copper and spoons made of this metal, should always be perfectly clean before using. The afflicting case of poisoning stated to have taken place recently at Baton Rouge, La., by an old copper kettle in the well, shows how careful we should be of the water we drink and with which our food is cooked. If the water of that well had been treated with amonia it would have turned blue, or if a little weak vitriol had been put into a cup of such water and a bright needle suspended in it for some hours, the needle would have been coated with the copper. These simple tests, we believe will not only be interesting but valuable to many.

A Carat.

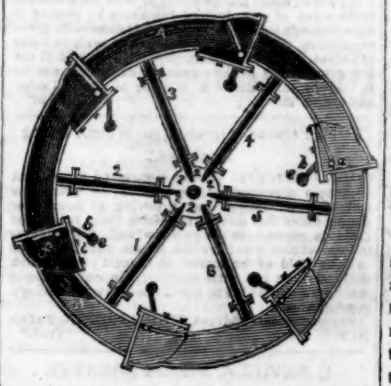
A carat is a weight of four grains, used in weighing diamonds, but used in reference to gold, the mass is supposed to weigh 24 carats, 15 grains each, and "22 carats fine" means there are 22 carats of pure gold and two carats of alloy, and this 22 carats is about the fineness of our gold coin; or, as expressed in the mint term, 22 carats 917 thousandths fine.

History of the Rotary Engine.

Prepared expressly for the Scientific American.

MASTERMAN'S ROTARY ENGINE.

Fig. 43.



This engine was patented by Thomas Masterman in 1821.

Fig. 43. represents a vertical and central section of the troke (being that part of the engine which revolves.) Fig. 44 is a transverse section of it, and of the two masks after mentioned. The troke is composed of the axis, of the nucleus (being the central parts, and through which the axis passes), of the annulus (being a hollow ring, in which are placed valves), and of the radii (being the steam passages between the nucleus and the annulus.) The surface of the face is a perfect plane. The axis passes through the hole 1 at right angles with the plane of the face. Six holes 2 of similar figure and dimensions with each other, are sunk in the face, at equal distances, in a direction parallel to the axis, for three or four inches; then curving into a direction of right angles with the axis, they open in the periphery of the nucleus.

The annulus A consists of six equal segments. At each of their joints is fixed a valve, which, by being ground on its seat, is rendered steam-tight when closed.

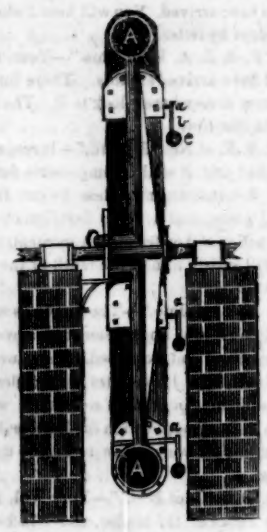
The radii (1, 2, 3, 4, 5, 6) are connected with the nucleus and annulus, so as to form steam tight communications between each hole in the face and the inside of the annulus. Fig. 45 is a plan of the inner mask; being a circular plate of metal, of equal diameter with the face, about two inches thick, and having each side perfect planes parallel to each other.

There are four holes, 1, 2, 3, 4, through it: 1 is of sufficient size to admit the axis; 2, 3, 4, are each one-sixth of the space that would be included by completing the two concentric circles, segments of which form the sides of those holes; and those circles are described with the same radii as the segments of those which bound the holes in the face. Thus, each of these holes would extend over one of the holes in the face, and one of the adjoining spaces: the space between 2 and 3 is of such dimensions as just to cover completely one of the holes in the face. 4 is situated so as to leave equal spaces between it and 2 and 3.

The periphery of this mask is clasped by an iron hoop, from which projects a lever, extending nearly to the annulus, and having a small inclined bar placed across its end. The two projections from fig. 45 represent the beginning of the lever.

The outer mask is a circular piece of metal of the same diameter, and about the same thickness as in the inner mask.

Fig. 44.



The axis passes through both masks; the inner mask is placed next the face, the other next the inner mask, and both are kept closely pressed towards the face (by means of screws acting on the back of the outer mask) so as to be steam-tight with each other and with the face: a trifling pressure suffices to make them so, the opposed surfaces having been ground on each other. The outer mask is placed in such a position with respect to fig. 43, as that the pipe 2 may be horizontal, and point towards radius, fig. 44, and it always remains stationary. The inner mask is placed in such a position with respect to the outer mask, as that the holes 2, 3, 4, in the former may communicate with pipes corresponding in the latter, and thus form a communication between the pipes communicating with the boiler and the air. Thus the holes in the inner mask are for the same relative purpose as the pipes in the outer mask.

The transverse sections of both masks, placed in their relative positions, are represented in fig. 44.

The corresponding letters in fig. 43 and 44 refer to the corresponding parts in figure: *p* *p* is the axis.

As the valves, and the gear for regulating them, are precisely the same in each segment of the annulus, only two of them (one showing their position closed, the other open) are lettered for reference.

Each valve *f*, is similar to the other and opens in the same direction; its gudgeons, moving freely in sockets, fixed to the sides of the annulus nearest the axis

Fig. 45.

Their working-gear is as follows: *a* is a small hollow protuberance or bonnet screwed on the annular, and communicating with the inside of it; on one of its inner sides is a socket, on the opposite a stuffing-box; one end of a spindle works in the socket, the other passes through the stuffing-box to the outside of the bonnet; to this end is attached the lever *b*, and to the centre is attached the lever *c*; both levers being at right angles with the spindle, and in the opposite direction to each other. To the extremity of *c* is attached (by a moveable joint) the rod *d*, and the extremity *b* is fixed the weight *e*, being more than sufficient to counterpoise *f*, which is connected with it by means of a moveable joint at the other end of *d*, and attached to the centre of *f*. The levers are so placed as to cause *f* to be half open when they point to the axis Thus it is evident that, during the revolutions of the troke, two of the valves *f* on its ascending side (denoted by the arrow) will, by the mere preponderance of *e*, be shut, and the whole of the others will be open, as represented in fig. 43.

For more easily comprehending the action of these valves, let it be considered that their movements are regulated by the mere gravity of *e*. The machinery to which motion is to be imparted is attached to that end of the axis next fig. 43.

The steam is generated and condensed in the usual manner.

The principle on which the engine acts, is by a liquid body (water of mercury for instance) placed in the annulus, being pressed on one side of the troke by the steam, until that side gain such a preponderance over the other as to overcome the resistance of the machinery attached to its axis, and by being then sustained there, so as to maintain the preponderance during the revolution of the troke.

The engine represented by the engraving is one in which water is the liquid made use of in the annulus.

New Camphor Solution.

Sir James Murray proposes a new vehicle for holding camphor solution, which may be exhibited in doses considerably greater, and with less irritation, than it has hitherto been given. The vehicle proposed is liquid magnesia, which he considers superior to almond emulsion, or alcohol.

Valuable Remedy for Intemperance.

Dr. Schreiber of Stockholm, Sweden, has succeeded in curing drunkards of their bad habits. He isolates the patient, gives him brandy and water to drink, prepares all his food with brandy and water, and mixes these with his tea and coffee. At the end of a few weeks, the regimen produces an uncontrollable disgust and repugnance. A physician should, however, watch the operation for fear of apoplexy and cerebral congestion. One hundred and thirty nine soldiers were so treated with perfect success.

Fried Potatoes.

The French cooks at the large hotels are making this dish very fashionable. The potatoes are peeled, wiped, and cut into thin slices, then thrown into a frying pan containing an abundance of hot lard; as soon as they become brown and crisp, they are thrown into a cullender to drain, and then sprinkled with salt, and served up as hot as possible. It is used as a breakfast dish.